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Tables

1.0 Introduction

HydroScience Engineers, Inc. (HSe) was retained by Analytical Environmental Services, Inc. (AES) to complete a preliminary evaluation of the water and wastewater service requirements for a proposed expansion to the Thunder Valley Casino. The study was completed in February 2008 and included as an appendix in the Draft Tribal Environmental Impact Report (TEIR) (AES, 2008). The expansion project was approved by certification of the Final and Revised Draft TEIR by the United Auburn Indian Community (UAIC) Tribal Council on July 9, 2008. Since that time, the scope of the casino expansion has been reduced and revised.

This update to the original study provides a revised evaluation of the proposed facility requirements and a preliminary design of key water and wastewater facilities. This update focuses on only those aspects of the February 2008 report that are changed by this revision to the casino expansion program. For convenience, the numbering of report elements (sections, figures, tables, etc.) in this update matches the February 2008 report, and major sections which are unchanged in this update are acknowledged.

1.1 Background

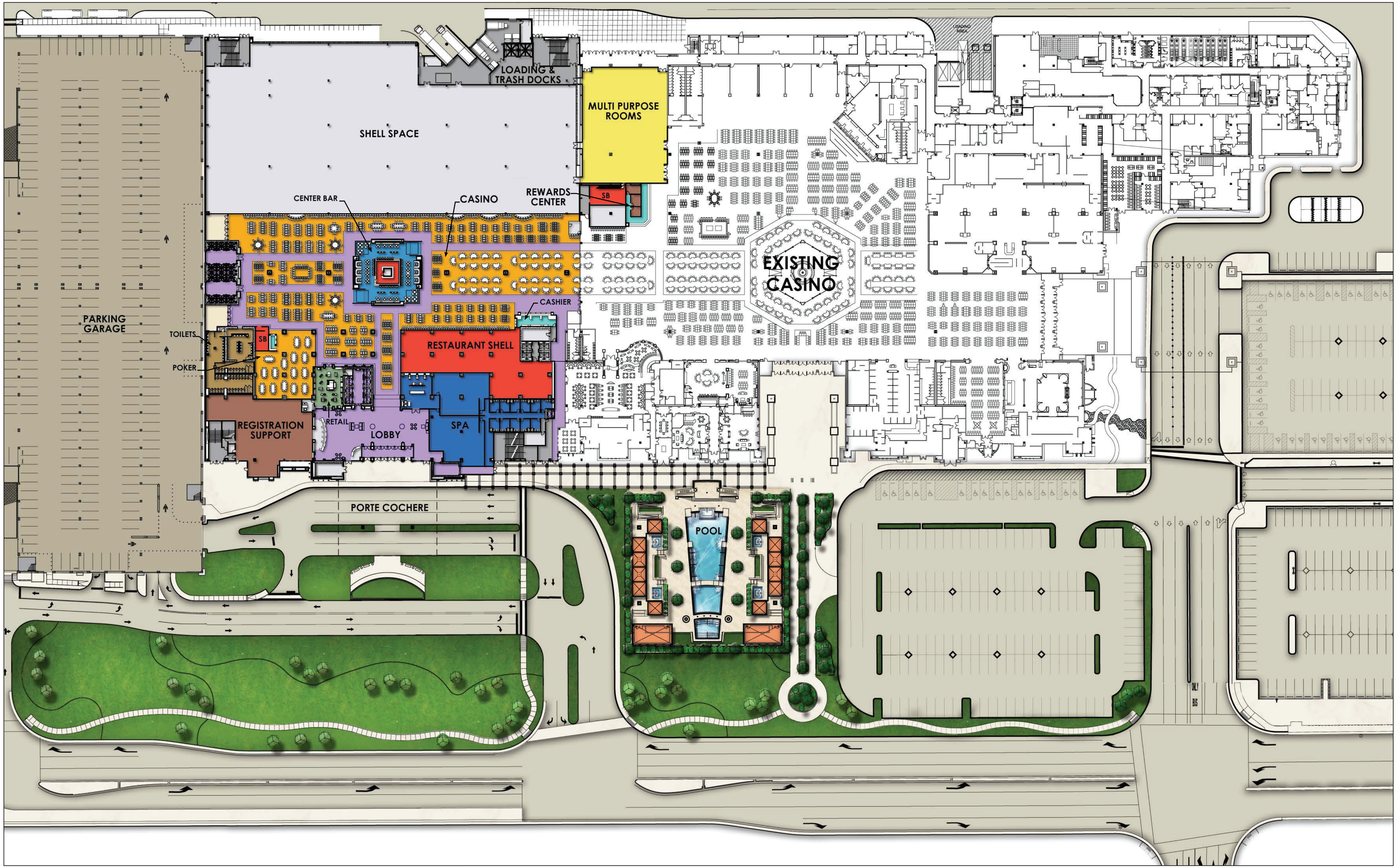
(This section is unchanged.)

1.2 Project Description

The current proposed scope of the gaming and entertainment facility is illustrated in **Figure 1-4.** Construction of the various project components is expected to be completed in at least two phase sand includes an additional 275,000 sq-ft of gaming area, restaurants, bars, entertainment lounge and support areas to its existing 200,000 sq-ft facility. In addition, the Tribe proposes to add a 400-room hotel and a new parking garage. This is a reduction from the scope of the expansion described in the February 2008 report.

1.3 Objectives

(This section is unchanged.)



SOURCE: Steelman Partners, 2/19/2009; AES, 2009

Figure 1-4
Proposed Site Plan

2.0 Current and Projected Flows

This section outlines the design criteria and general assumptions for estimating the wastewater production and water demands anticipated for the revised facility expansion. The analysis begins with estimates of wastewater production, since unit wastewater flow for the various services and customers are more readily available than water usage information. This data is subsequently used to back-calculate the corresponding water demand.

In addition to the water and wastewater flows, recycled water demand and its influence on the water demand and wastewater disposal requirements has also been accounted for in the revised calculations.

2.1 Wastewater Flows

The same model and facility program used to calculate the projected wastewater flows in the February 2008 report were used to recalculate the projected wastewater flows for the revised expansion program.

Table 2-2 provides estimated wastewater flows for the entire casino facility after the modified expansion is complete. This table summarizes the complete wastewater flow model provided in **Appendix A**.

Table 2-2 – Estimated Casino & Hotel Expansion Wastewater Flows

	Quantity (each)	Units (each)	Base Flow (gpd)	Average Day Flows (gpd)	Peak Day Flows (gpd)
Casino					
Slots	2,700	Seats	48,600	32,284	60,750
Tables (98 tables @ 6-7 seats per table)	675	Seats	12,150	8,071	15,188
Phase 1 Expansion Slots	300	Seats	5,400	3,587	6,750
Phase 1 Expansion Tables	360	Seats	6,480	4,305	8,100
Phase 1 Exp Poker Tables (17 Tables @ 11 seats per)	187	Seats	3,366	2,236	4,208
Future Phase Expansion Slots	0	Seats	0	0	0
Future Phase Expansion Tables	200	Seats	3,600	2,391	4,500
Staff					
Casino Staff	1,793	Employees	32,274	11,987	22,592
Phase 1 Expansion Add'l Casino Staff	200	Employees	3,600	1,337	2,520
Restaurants					
Buffet	490	Seats	94,080	62,832	82,320
Koi Palace	174	Seats	31,320	20,917	27,405
Thunder Café	225	Seats	18,900	12,623	16,538
Austin's Steakhouse	165	Seats	11,880	7,934	10,395
Food Court	184	Seats	52,992	35,391	46,368
Falls Bar	100	Seats	9,600	6,411	8,400
Thunder Bar	22	Seats	2,112	1,411	1,848
Phase 1 Expansion Restaurant #1	200	Seats	28,800	19,234	25,200
Phase 1 Expansion Theme Bar	125	Seats	12,000	8,014	10,500
Future Phase Expansion Restaurant #2	200	Seats	28,800	19,234	25,200
Future Phase Expansion Restaurant #1	200	Seats	28,800	19,234	25,200
Phase 1 Expansion Banquet	1,400	Seats	58,800	39,270	51,450
Phase 1 Expansion Room Service (300 rooms)	234	Meals	2,808	2,457	2,457

	Quantity (each)	Units (each)	Base Flow (gpd)	Average Day Flows (gpd)	Peak Day Flows (gpd)
Future Phase Expansion Room Service (100 rooms)	78	Meals	936	819	819
Hotel					
Phase 1 Expansion Rooms	300	Rooms	45,000	45,000	45,000
Future Phase Expansion Rooms	100	Rooms	15,000	15,000	15,000
Conference Room					
Fut. Ph. Exp. Ballroom, Meeting Space, Business Center	4,660	Occupancy	41,940	20,970	31,455
Phase 1 Expansion Multipurpose Room	1,000	Occupancy	18,000	9,000	13,500
Other Facilities					
Central Plant	1	Waste Flow	0	0	0
Phase 1 Expansion New Central Plant	1	Waste Flow	45,000	22,500	45,000
Phase 1 Expansion Spa Center	160	Occupancy	2,880	1,646	2,520
Phase 1 Expansion Pools and Water Features	1	Waste Flow	1	1	1
Fire Station	1	Waste Flow	330	189	289
Theater					
Future Phase Entertainment Lounge	2,000	Seats	9,000	4,725	9,000
Subtotal Existing				***200,000***	***290,000***
Subtotal Phase 1 Expansion				***160,000***	***220,000***
Subtotal Future Phase Buildout				***80,000***	***110,000***
Daily Flows				**442,000**	**620,000**

Total flows are rounded to the nearest two significant figures.

KEY
Existing
Expansion
Future Buildout

2.2 Potable Water Demand

Table 2-4 provides the estimated water demand for the revised casino expansion program. This table summarizes the complete water demand flow model provided in **Appendix A**. The types of water demands in the expanded casino facilities, and method of computing these demands, are unchanged from the February 2008 report. These numbers are preliminary and are for planning purposes only.

Estimated fire flow requirements for the expansion have changed since the February 2008 report, which indicated a fire flow requirement of 3000 gpm at 20 psi. The current fire flow requirement for the revised casino expansion program is 3750 gpm at 20 psi. This new requirement is documented in **Appendix B**. As before, the public water system will meet the fire flow duration requirements, and storage available in the existing one million gallon on-site potable water storage tank can be fully utilized for meeting daily water demand peaks. A portion of this volume does not need to be reserved for providing fire flows.

2.3 Recycled Water

(This section is unchanged.)

Table 2-4 – Estimated Casino & Hotel Expansion Water Demand

	Quantity (each)	Units (each)	Base Flow (gpd)	Average Day Flows [a] (gpd)	Peak Day Flows [b] (gpd)
Casino					
Slots	2,700	Seats	53,460	35,500	66,800
Tables (98 tables @ 6-7 seats per table)	675	Seats	13,365	8,900	16,700
Phase 1 Expansion Slots	300	Seats	5,940	3,900	7,400
Phase 1 Expansion Tables	360	Seats	7,128	4,700	8,900
Phase 1 Exp Poker Tables (17 Tables @ 11 seats per)	187	Seats	3,703	2,500	4,600
Future Phase Expansion Slots	0	Seats	0	0	0
Future Phase Expansion Tables	200	Seats	3,960	2,600	5,000
Staff					
Casino Staff	1,793	Employees	35,501	13,200	24,900
Phase 1 Expansion Add'l Casino Staff	200	Employees	3,960	1,500	2,800
Restaurants					
Buffet	490	Seats	103,488	69,100	90,600
Koi Palace	174	Seats	34,452	23,000	30,100
Thunder Café	225	Seats	20,790	13,900	18,200
Austin's Steakhouse	165	Seats	13,068	8,700	11,400
Food Court	184	Seats	58,291	38,900	51,000
Falls Bar	100	Seats	10,560	7,100	9,200
Thunder Bar	22	Seats	2,323	1,600	2,000
Phase 1 Expansion Restaurant #1	200	Seats	31,680	21,200	27,700
Phase 1 Expansion Theme Bar	125	Seats	13,200	8,800	11,600
Future Phase Expansion Restaurant #2	200	Seats	31,680	21,200	27,700
Future Phase Expansion Restaurant #1	200	Seats	31,680	21,200	27,700
Phase 1 Expansion Banquet	1,400	Seats	64,680	43,200	56,600
Phase 1 Expansion Room Service (300 rooms)	234	Meals	3,089	2,700	2,700
Future Phase Expansion Room Service (100 rooms)	78	Meals	1,030	900	900
Hotel					
Phase 1 Expansion Rooms	300	Rooms	49,500	49,500	49,500
Future Phase Expansion Rooms	100	Rooms	16,500	16,500	16,500
Conference Room					
Fut. Ph. Exp. Ballroom, Meeting Space, Business Center	4,660	Occupancy	46,134	23,100	34,600
Phase 1 Expansion Multipurpose Room	1,000	Occupancy	19,800	9,900	14,900
Other Facilities					
Central Plant	1	Waste Flow	0	0	0
Phase 1 Expansion New Central Plant	1	Waste Flow	189,000	94,500	189,000
Phase 1 Expansion Spa Center	160	Occupancy	3,168	1,800	2,800

	Quantity (each)	Units (each)	Base Flow (gpd)	Average Day Flows [a] (gpd)	Peak Day Flows [b] (gpd)
Phase 1 Expansion Pools and Water Features	1	Waste Flow	42,000	22,200	42,000
Fire Station	1	Waste Flow	363	200	300
Theater					
Future Phase Entertainment Lounge	2,000	Seats	9,900	5,200	9,900
Subtotal Existing				***220,000***	***320,000***
Subtotal Phase 1 Expansion				***270,000***	***420,000***
Subtotal Future Phase Buildout				***90,000***	***120,000***
Daily Flows				**580,000**	**860,000**

[a] Average Day Demand = (Average Day Wastewater Flow*1.1 + Cooling Tower Evaporation and Drift + Pool and Water Feature Makeup Water).

[b] Peak Day Demand = (Peak Day Wastewater Flow*1.1 + Cooling Tower Evaporation and Drift + Pool and Water Feature Makeup Water).

Assumes water demand for evaporation and drift losses are equal to five times the blow down waste.

Total flows are rounded to the nearest two significant figures.

KEY

Existing

Expansion

Future Buildout

3.0 Regulatory Requirements

(This section is unchanged.)

4.0 Water Supply Assessment

This section describes the components necessary to provide water supply service to the revised Thunder Valley expansion program.

4.1 Existing Water Supply

(This section is unchanged.)

4.2 Potable Water Demand

Table 4-1 summarizes the water demand for the revised casino expansion discussed in **Section 2**.

Table 4-1 – Estimated Casino & Hotel Expansion Water Demand

	Phase 1		Future Phase Buildout	
	Average Day Demand	**Peak Day Demand**	**Average Day Demand**	**Peak Day Demand**
Water demand [a]	490,000	740,000	580,000	860,000

[a] Excludes landscape irrigation, which is supplied with recycled water.
Water demands rounded to the nearest 1,000 gpd.

The existing 1 million gallon storage tank will be available to buffer hourly peak demands. Therefore, the peak day demands shown in **Table 4-1** represent the peak demands that must be met by PCWA, the City of Lincoln, and, if applicable, the existing on-site wells.

4.2.1 Water Conservation

(This section is unchanged.)

4.2.2 Fire Flow

Estimated fire flow requirements for the expansion have changed since the February 2008 report, which indicated a fire flow requirement of 3000 gpm at 20 psi. The current fire flow requirement for the revised casino expansion program is 3750 gpm at 20 psi, as documented in **Appendix B**. . PCWA has indicated that the public water system can meet this requirement.

4.3 Water Supply Alternatives

This Section discusses the different alternatives for supplying potable water to the revised casino expansion. Three alternatives are evaluated:

Alternative 1: Expand existing PCWA connection to meet 100% of project needs.

Alternative 2: Connect to City of Lincoln water supply to serve 100% of project needs.

Alternative 3: Continue existing PCWA connection and utilize existing on-site wells to provide additional demands. In addition to the February 2008 report, this alternative now examines a reduced-size expansion of the PCWA connection plus well supplementation.

Note that all three alternatives would require that the existing domestic potable water booster pump station be upgraded to handle the estimated expansion water demands. The final scope of the facility upgrade would be completed during the design phase of the project.

4.3.1 Placer County Water Agency

(This section is unchanged.)

4.3.2 City of Lincoln

(This section is unchanged.)

4.3.3 Wells (Groundwater Blending)

This Section discusses the feasibility of serving the future potable water demands of the revised casino expansion by using the existing PCWA connection (limited to 250 gpm peak instantaneous flow), potentially increasing the size of this connection, and supplementing supply with the existing wells (ie. blending).

4.3.3.1 Background

(This section is unchanged.)

4.3.3.2 Available Flow Considerations

As previously discussed and as shown in **Table 4-1**, the revised casino expansion will have a peak day potable water demand of 0.86 MGD, or about 595 gpm. Based on the instantaneous flow limitations stated above, the combined peak flow that can be delivered by the existing PCWA connection and the existing wells is the sum of 250 gpm and 350 gpm, which equals 600 gpm. This total supply exceeds the anticipated peak day demand.

4.3.3.3 Water Quality and Flow Considerations

The groundwater quality of the existing wells was analyzed in September 2003 by California Laboratory Services (CLS) and was found to have high concentrations of boron, approximately 3,200 µg/L. This high concentration of boron in the groundwater exceeds the WWTP effluent limitation for boron of 700 µg/L, as stated in the existing WWTP NPDES permit. The WWTP is not designed to remove boron, which is a dissolved metal. Due to this high concentration of boron, if the groundwater wells were to be utilized to supplement the water supply from PCWA, then the target maximum blending ratio of well water to total supplied water volume should not exceed 14%[1], in order to avoid the risk of a WWTP discharge permit violation. Because of this limitation, the wells alone cannot supply the additional potable water demand of the revised casino expansion. Some expansion of the PCWA supply will also be needed. **Table 4-3** provides the corresponding flows for this blending scenario for Phase 1 and Future Buildout.

4.3.3.4 Facility Requirements

Facility requirements to provide the water sources and peak flows indicated in **Table 4-3** would be as follows:

- Upgrade the existing 4-inch standard water meter to a 4-inch turbo meter.
- Install a pair of new 12-inch unmetered fire system laterals, connect them to the 18-inch main and to all on-site hydrants and fire protection systems through a pair of 12-inch double check backflow preventers.

[1] This maximum blending percentage is based on a mass balance of PCWA potable water with a boron concentration of zero (non-detect) and well water supply with a boron concentration of 3.2 mg/l, blended at a ratio that will not exceed a combined boron concentration of 0.7 mg/l with a safety factor exceeding 20%. The PCWA Consumer Confidence Report (**Appendix E**) shows no boron concentration.

- Decommission the existing high-flow fire pumps and disconnect the pumps and tank from the fire protection systems.
- Upgrade the existing low-flow domestic booster pumps to handle the future peak day domestic water demand. Utilize the existing storage tank to buffer peak hour demands.

Table 4-3 – Maximum Flows for Blended Water Supply

Water Source	Phase 1		Future Phase Buildout	
	Peak Day Flow (gpd)[a]	Peak Day Flow (gpm)[a]	Peak Day Flow (gpd)[a]	Peak Day Flow (gpm)[a]
Existing PCWA Supply	360,000	250	360,000	250
Additional PCWA Supply	275,000	190	379,000	260
On-Site Wells	105,000	70	121,000	85
Total Water Supply	**740,000**	**510**	**860,000**	**595**

[a] All values are rounded.

4.3.4 Water Storage Tank and Pump Station

(This section is unchanged.)

4.4 Evaluation of Water Supply Alternatives

This section compares the three water supply alternatives and discusses the factors that would determine which is the most viable alternative. Final conclusions and recommendations are given in Section 7.

Alternative 1 – Expand existing PCWA connection to meet 100% of project needs: (This paragraph is unchanged.)

Alternative 2 – Connect to City of Lincoln water supply to meet 100% of project needs: (This paragraph is unchanged.)

Alternative 3 – Continue PCWA connection and utilize existing on-site wells to provide additional demands: The use of the existing on-site wells to supplement water supply from PCWA to meet projected water demands for the expansion is feasible. The blending ratio of well water to total water supply is limited by the high boron concentrations in the on-site groundwater supply and the maximum boron concentration allowed by the WWTP discharge permit. Based on these limitations, the total anticipated potable water demands of the Phase 1 and Future Phase Buildout scenarios of the revised casino expansion can be met by a combination of the existing PCWA supply, on-site wells limited to no more than 14% of the total water supplied, and an additional PCWA allotment.

5.0 Wastewater Treatment Assessment

This section describes components necessary to provide wastewater treatment to the revised Thunder Valley expansion program.

Any on-site and off-site wastewater facilities are to comply with all applicable permitting requirements. The wastewater treatment facilities are to be designed in a manner that does not limit existing uses or the proposed expansion.

All of the recommended treatment facilities described in this section are preliminary, and should be utilized for planning purposes only.

5.1 Existing On-Site Wastewater Treatment Plant

(This section is unchanged.)

5.2 Expansion Wastewater Treatment Alternatives

(This section is unchanged.)

5.3 Alternative 1 - City of Lincoln Wastewater System Connection

(This section is unchanged.)

5.4 Alternative 2 – South Placer Wastewater Authority Connection

(This section is unchanged.)

5.5 Alternative 3 - On-Site Wastewater Treatment Plant Expansion

The following sections describe the proposed components of the WWTP expansion to accommodate the revised expansion of the casino facilities. A process flow diagram of the proposed expanded WWTP is provided in **Figure 5-8**.

5.5.1.1 Influent Lift Station and Emergency Storage

In order to convey the increased wastewater flow to the WWTP, a new influent lift station would be required to replace the existing one. The proposed pump station will consist of 2 duty and 1 standby submersible sewage pumps in a large buried concrete wet well. The influent lift station will also be equipped with an odor control system.

The total capacity of the pump station will be approximately 660 gpm (0.95 mgd). This flow can be met with one pump out of service. Wastewater would be conveyed to the headworks via a pressurized force main. The pump station wet well will provide approximately 210,000 gal of emergency storage in the event of a treatment system shutdown or unanticipated short-term peak flow.

5.5.1.2 Headworks

The headworks will receive raw, unscreened wastewater from the influent lift station, screen larger debris to remove it from the waste stream, and discharge screened effluent to the influent diversion lift station. Screenings would be collected for disposal at a Class III landfill.

The headworks will consist of screening equipment and flow measurement equipment. Fine screening is accomplished with a 2-mm perforated plate inclined self-cleaning rotary drum screen.

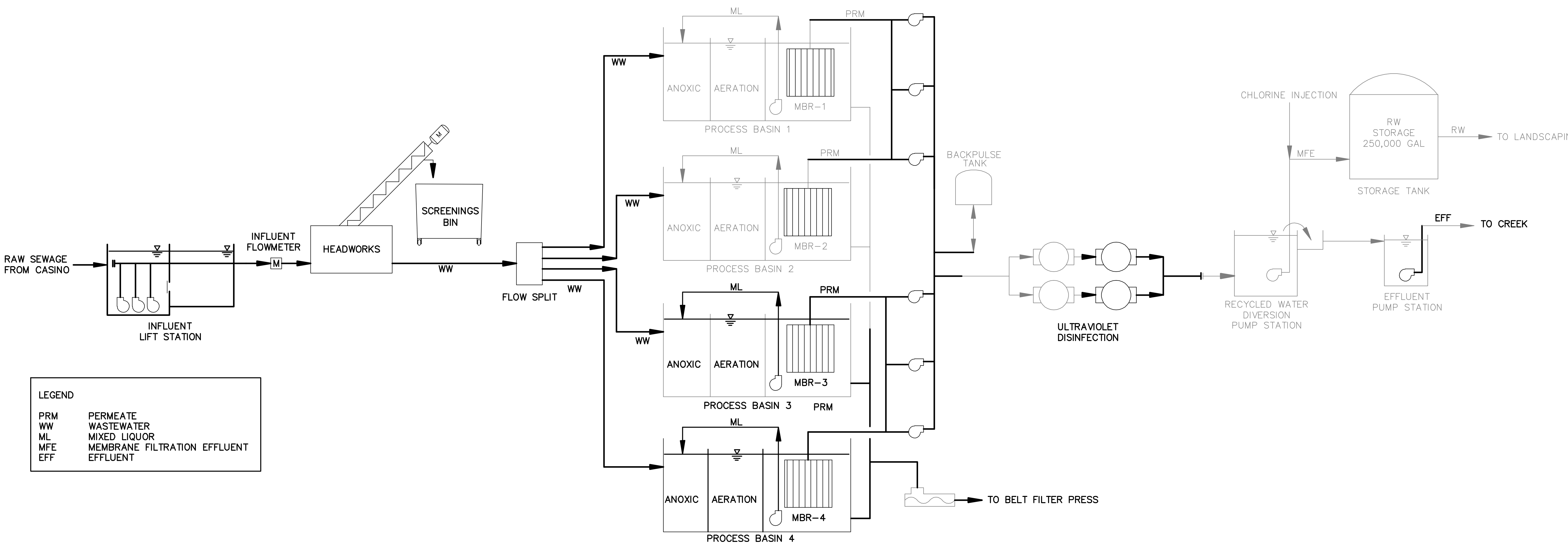


Figure 5-8
Thunder Valley Casino Expansion
Water & Wastewater Feasibility Study
EXPANDED WWTP PROCESS FLOW DIAGRAM

HydroScience Engineers, Inc.

Screenings from the waste stream are removed and are washed and compacted. Flow measurement is accomplished with a continuously recording inline flow meter.

5.5.1.3 Influent Diversion Pump Station

This facility has been eliminated from the planned WWTP expansion. Emergency storage has been incorporated into the pump station design (see **Section 5.5.1.1**) and therefore a separate diversion pumping facility is no longer needed.

5.5.1.4 Emergency Storage

Emergency storage has been incorporated into the pump station design (see **Section 5.5.1.1**).

5.5.1.5 Return Activated Sludge / Influent Mixing Wet Well

This facility has been eliminated from the planned WWTP expansion. Mixing of Return Activated Sludge (RAS) and influent will now be accomplished by submersible recirculation pumps in each process train discharging to the anoxic and aerobic basins.

5.5.1.6 Immersed Membrane Bioreactor System

The microfiltration facilities are designed for biological oxidation, nitrification, denitrification, and solids removal. Collectively, the equipment that performs these functions is referred to as an Immersed Membrane Bioreactor System (MBR). The proposed expansion would provide four process trains with an average day capacity of 450,000 gpd and a peak day capacity of 700,000 gpd.

Each of the process trains would be sized to handle an approximate flow rate of 230,000 gpd per train. At this size, each process train has the ability to be taken off-line for maintenance during off-peak days at the casino and hotel facility.

An overhead crane with a traveling bridge is provided to move membrane cassettes for service and/or cleaning. The existing overhead crane would be augmented to travel over, and service, the membrane cassettes of a new process train. A chemical dip tank is provided at the east end of the basin, near the membrane compartments. The dip tank is used for periodic soak cleanings of the membrane cassettes.

Biological treatment processes would operate in the same manner as the existing system.

The membrane separation process would operate in the same manner as the existing system, and the same type of membranes would be used. The number of membranes would be increased to accommodate the increased flow, as would the number and size of permeate pumps and other support facilities.

5.5.1.7 UV Disinfection

The existing inline UV disinfection vessels would be supplemented by two additional inline units of the same size per unit, providing double the overall disinfection capacity to correspond with the doubling of peak day flow. Piping would be configured to run the UV units in pairs, operating in series.

5.5.1.8 Recycled Water Diversion Pump Station

(This section is unchanged.)

5.5.1.9 Effluent Pump Station

(This section is unchanged.)

5.5.1.10 Chemical Storage and Metering Facilities

(This section is unchanged.)

5.5.1.11 Recycled Water Storage Tank and Pump Station

(This section is unchanged.)

5.5.1.12 Operations Building

(This section is unchanged.)

5.5.1.13 Solids Handling Building

This facility will be reduced in size and simplified. The existing belt press will provide the capacity required to dewater solids from the expanded WWTP. The belt press will be relocated to an area near the Recycled Water Storage tank and enclosed by a canopy, similar to the current installation.

5.5.1.14 Biosolids Disposal

Biosolids disposal will remain as described in the February 2008 report, except that only one belt press will be used. The potential for belt press failure will be addressed by the ability to temporarily increase solids inventory in the MBR process and if necessary by temporary utilizing solids dewatering bags in hauling bins to drain the water. The temporary system can be acquired on adequately short notice. A large inventory of belt press spare parts will be kept on hand.

5.5.2 Expanded Plant Design Parameters

The expanded plant design parameters are summarized in **Table 5-3** below. Refer to **Figure 5-9** for the proposed expansion facilities site plan.

Table 5-3 – Expanded Plant Design Parameters

Parameter	Value
Design Flows	
Average Flow:	450,000 gpd
Average Peak Day Flow:	700,000 gpd
Influent Pump Station	
Purpose:	Lift raw wastewater to headworks facilities
Type:	Submersible non-clog centrifugal
Quantity:	3 (2 duty, 1 standby)
Capacity:	360 gpm @ 33 ft TDH each
Motor power:	5 HP each
Control:	Variable frequency drive (VFD), level transmitter, back-up float switch start and shutoff
Headworks	
Screening facilities:	Rotary drum screen with 2-mm circular perforations, integral shaftless helical scraper/conveyor and compactor
Metering facilities:	Magnetic flow meter on influent pipe
Odor control:	Corrosion resistant stainless steel enclosure
Control:	Continuous operation
MBR Process Trains	
Number of process trains:	4
Process train basins:	Anoxic basin, aeration/microfiltration membrane (all basins concrete)
Average day flow:	112,500 gpd per train (450,000 gpd total)
Peak Weekend flow:	175,000 gpd per train (700,000 gpd total)
Peak six-hour flow:	165 gpm per train (660 gpm total)
Membranes	
Type:	Hollow fiber, outside-in flow
Number of units	4 per process train (16 total)

Parameter	Value
Total Membrane Surface Area	77,440 ft^2
Flux at average day flow (one unit offline):	6.2 gfd
Flux at max day flow (one unit offline)::	9.6 gfd
Flux at peak hour flow (one unit offline)::	13.1 gfd
Anoxic Basins	
Quantity:	1 per process train (4 total)
Volume:	38,000 gallons per basin (nominal)
Dimensions:	21’-8” x 16’-6” (each basin)
Operating depth:	14 ft
Total depth:	16 ft
HRT:	5.1 hours per basin (@ peak day flow)
Anoxic Basin Mixers	
Type:	Submersible horizontal axial flow propeller
Quantity:	1 per process train (4 total)
Control:	Fixed speed, continuous
Motor power:	2.5 HP each
Aeration/Membrane Basins	
Quantity:	1 per process train (4 total)
Volume:	140,000 gallons per basin (nominal)
Dimensions:	46’-2” x 16’-6” (each basin)
Operating depth:	14 ft
Total depth:	16 ft
Aerator type:	Fine bubble diffusers (membrane type)
Process air flow:	500 scfm per basin
Scour air flow:	350 scfm per basin
HRT:	11.0 hours per basin (@ peak day flow)
Recirculation Pumps	
Type:	Submersible centrifugal non-clog
Quantity:	1 duty per process train
Control:	Constant speed
Capacity:	1,458 gpm @ 15 ft TDH
Motor power:	10 HP each
Sludge Wasting Pumps	
Type:	Progressive cavity
Quantity:	1 duty, 1 standby (2 total)
Control:	Variable frequency drive (VFD)
Capacity:	120 gpm
Motor power:	7.5 HP each
Air Blowers	
Type:	Process: High-Speed Turbo; Air Scour: Positive displacement
Quantity:	4 process air blowers, 3 scour air blower, (7 total)
Control:	Variable speed
Capacity:	Process Blower: 600 scfm @ 6.5 psi Air Scour Blower: 464 scfm @ 6.5 psi
Motor power:	Process Blower: 30 HP Air Scour Blower: varies
Permeate and Backpulse Pumps	
Type:	Reverse-Acting Rotary Lobe
Quantity:	6 total

Parameter	Value
Control:	Variable frequency drive (VFD)
Capacity (Permeate Mode):	395 gpm each @ 20 ft TDH
Motor power:	10 HP each
Backpulse Tanks	
Backpulse duration:	2 minutes
Required backpulse volume:	450 gallons
Tank type:	polyethylene
Tank quantity:	1
Tank working capacity:	450 gallons each
Tank diameter:	64 inches
Tank side wall height:	84 inches
Sodium Hypochlorite Storage and Feed System	
Chemical feed pump type:	peristaltic, variable speed
Pump quantity:	1 backpulse, 1 recycled water disinfection (1total)
Hypochlorite solution strength:	12.5%
Hypochlorite feed rate:	15 gph
Metering pump range:	1 – 30gph each
Control strategy:	manual adjustment based on solution strength
Storage tank type:	drum
Quantity tanks:	2
Storage volume:	55 gallons
Sodium Hydroxide and Feed System	
Chemical feed pump type:	solenoid actuated diaphragm metering, variable frequency/stroke length
Pump quantity:	1 for each process train (5 total)
Sodium Hydroxide solution strength:	as mixed
Sodium Hydroxide feed rate:	15 gph
Metering pump range:	1-15 gph
Control strategy:	auto adjustment based on pH
Storage tank type:	high density polyethylene
Quantity tanks:	1 for each process train (5 total)
Storage volume:	15 gallons
Ultraviolet Disinfection Facilities	
Type:	316 SST chambers
Number of chambers:	4 (3 duty, 1 standby)
Type of lamps:	Medium Pressure Lamps
Transmittance:	90% minimum through quartz sleeves 65% minimum through wastewater
Capacity:	700 gpm each (peak flow)
Flow metering:	1 magnetic flow meter in the inlet pipeline
Control strategy:	Manual dose control
Sludge Dewatering Facility	
Purpose:	Dewater sludge
Type:	Gravity belt thickener / belt filter press
Quantity:	1 duty
Size:	0.50 M
Capacity:	1,000 lbs dry solids / hr
Maximum sludge flow:	120 gpm
Design sludge flow:	100 gpm

Parameter	Value
Control:	Variable frequency drive (VFD)
Recycled Water Diversion Pump Station (Formerly known as Effluent Pump Station)	
Purpose:	Point where microfiltered effluent is sent to the outfall pump station and/or the recycled water storage tank.
Type:	Submersible vertical turbine pumps
Quantity:	2 (1duty, 1 standby)
Capacity:	275 gpm @ 34 ft TDH each
Motor power:	3 HP each
Control:	Constant speed, level transmitter at recycled water tank, back-up float switch for start and shutoff
Recycled Water Diversion PS Wet Well Dimensions	7’x13’x 9’ (6,100 gallons)
Effluent Pump Station (Formerly known as Outfall Pump Station)	
Purpose:	Pumps microfiltered, UV disinfected effluent to the Orchard Creek Outfall
Type:	Vertical Turbine
Quantity:	2 (1 duty, 1 standby)
Capacity:	660 gpm @ 32 ft TDH each
Motor power:	10 HP
Control:	Variable speed, back-up float switch start and shutoff
Recycled Water Storage and Recycled Water Pump Stations	
Purpose:	To provide chlorine contact time and storage to support the recycled water demands of the casino.
Tank Construction	Welded steel, with baffle system
Quantity:	1 storage tank
Capacity:	250,000 gallons
Recycled Water Distribution Pumps	Recycled Water Pump Station
Type	Recycled Water Pump Station: Triplex package system
Capacity	Recycled Water Pump Station: 540 gpm @ 100 psi boost pressure
Control:	Variable speed, flow control, pressure control,

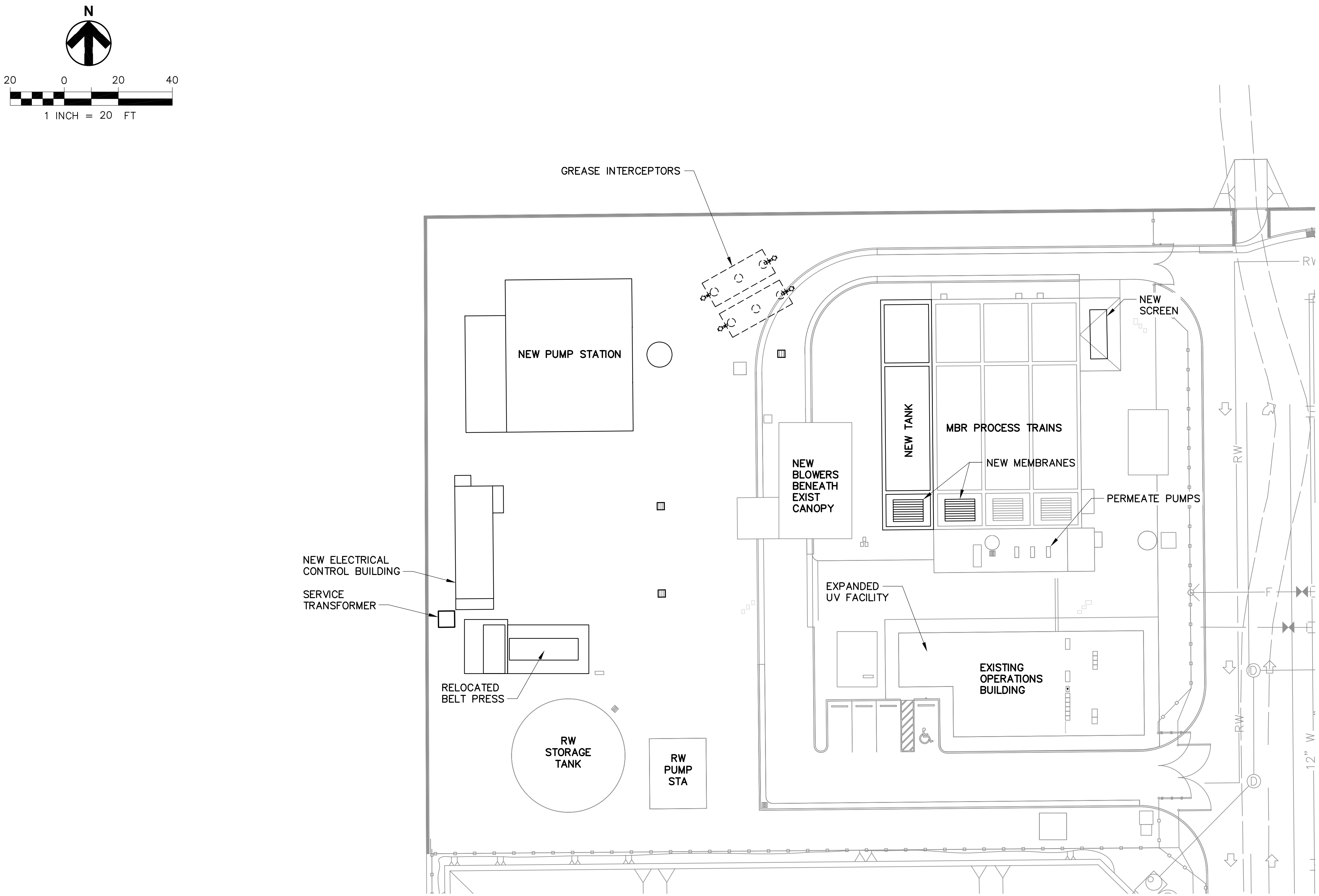


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Figure 5-9
Thunder Valley Casino Expansion
Water & Wastewater Feasibility Study
PROPOSED WWTP EXPANSION FACILITIES SITE PLAN

5.5.3 Non-Economic Analysis

(This section is unchanged.)

6.0 Wastewater Disposal Assessment

This section evaluates the feasibility of various options for treated wastewater disposal for the modified on-site wastewater treatment plant expansion alternative. This section evaluates two alternatives: off-site land disposal and surface water discharge.

Wastewater disposal facilities would be located during the design of the selected alternative. All of the recommended disposal facilities described in this section are preliminary, and should be utilized for planning purposes only.

6.1 Existing Wastewater Disposal Strategy

(This section is unchanged.)

6.2 Wastewater Disposal Alternatives

The following sections discuss the wastewater disposal alternatives considered for the expansion of the on-site WWTP option discussed previously in **Section 5**. The wastewater disposal alternatives considered were land disposal, in the form of spray fields or leach fields, and surface water discharge (the existing practice at Thunder Valley).

6.2.1 Land Disposal

6.2.1.1 Spray Fields

(This section is unchanged.)

6.2.1.2 Leach Fields

(This section is unchanged.)

6.2.1.3 Water Balance for On-Site/Off-Site Disposal

A water balance for the revised casino expansion is provided in **Table 6-1.** A detailed analysis is included in **Appendix K.** This analysis constitutes a preliminary estimate only. A final design by a licensed engineer would be necessary to determine actual size and placement.

Table 6-1 – Water Balance and Estimated Wastewater Disposal Requirements

Average Day Disposal Flows [a]	489,000
Landscape Irrigation (acres)	4
Spray Disposal (acres) [b]	64
Seasonal Storage (MG) [c]	107

[a] Average day disposal flows refer to Table 2-2.
[b] Areas rounded to the nearest acre.
[c] Volumes rounded to the nearest MG.

Based on the water balance analyses, the spray field area required to dispose of the effluent from the WWTP is approximately 64 acres. Additionally, a large seasonal storage basin would be required to store effluent during wet weather events.

6.2.1.4 Effluent Land Disposal Facilities

(This section is unchanged.)

6.2.2 Surface Water Discharge

(This section is unchanged.)

6.3 Evaluation of Wastewater Disposal Alternatives

(This section is unchanged.)

7.0 Conclusions

7.1 Water Supply

Section 4.4 summarized the feasibility issues associated with the three water supply alternatives presented. The alternatives are:

Alternative 1: Expand existing PCWA connection to meet 100% of project needs

Alternative 2: Connect to City of Lincoln water supply to serve 100% of project needs

Alternative 3: Continue PCWA connection and utilize existing on-site wells to provide additional demands

As discussed in **Section 4.4**, all three alternatives are feasible. Alternative 3 would require a combination of additional PCWA supply plus limited utilization of the wells, with the blending ratio of well water to total water supplied not exceeding 14% in order to maintain WWTP discharge permit compliance.

The preferred alternative should be selected based on cost and administrative factors, as well as a consideration of potential water quality issues.

7.2 Wastewater Treatment

(This section is unchanged.)

7.3 Wastewater Disposal

(This section is unchanged.)

8.0 Abbreviations

ADWF	average dry weather flow
AES	Analytical Environmental Services
AwA	Atwater loamy sand
AWWA	American Water Works Association
bgs	below ground surface
BOD	biochemical oxygen demand
BMP	best management plan
CCR	California Code of Regulations
CDF	California Department of Forestry
CEQA	California Environmental Quality Act
CF	cubic feet
cm	centimeter
CT	Contact Time (product of chlorine residual and modal contact time measured at the same point)
CTR	California Toxics Rule
CWA	Clean Water Act
DEIR	Draft Environmental Impact Report
DHS	Department of Health Services
DTRW	disinfected tertiary recycled water
EDU	equivalent dwelling unit
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
ft	feet
ft^2	feet squared
gal	gallon
gpd	gallons per day
gpm	gallons per minute
HgA	Hanford sandy loam
HSe	HydroScience Engineers, Inc.
I&I	inflow and infiltration
lf	linear foot
MBR	membrane bioreactor
MCC	motor control center
MF	microfiltration
MG	million gallon
mg/L	milligrams per liter
MGD	million gallons per day
mL	milliliter
mph	miles per hour
MOU	Memorandum of Understanding
MPN	most probable number
MSL	mean sea level
N	Nitrogen
NF	nanofiltration
NH_4	Ammonium
NO_3	Nitrate
NPDES	National Pollutant Discharge Elimination System
NTNC	Non-Transient/Non-Community
NTR	National Toxics Rule
NTU	nephelometric turbidity units
O&M	operation and maintenance

PCWA	Placer County Water Agency
psi	pounds per square inch
RAS	return activated sludge
RO	reverse osmosis
RPA	Reasonable Potential Analysis
RWD	Report of Waste Discharge
RWQCB	Regional Water Quality Control Board
SaA	San Joaquin sandy loam
SCADA	Supervisory Control and Data Acquisition
SCS	soil conservation service
SDWA	Safe Drinking Water Act
SPWA	South Placer Wastewater Authority
sq-ft	square feet
TDS	total dissolved solids
TDH	total dynamic head
TMDL	total maximum daily load
TO	tentative order
TSS	total suspended solids
TwA	Tujunga loamy sand
UF	ultrafiltration
UIC	Underground Injection Control
μm	micrometer
USDA	United States Department of Agriculture
UV	ultraviolet
WAS	Waste activated sludge
WDR	Waste Discharge Requirement
WDRO	Waste Discharge Requirement Order
WRR	Water Reuse Requirements
WRRO	Water Reuse Requirements Order
WWTP	Wastewater Treatment Plant

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